

REMARKS

Claims 8-11, 13-17, 19-26 are pending in this application. Claims 1-7 drawn to non-elected invention due to the Restriction Requirement have been withdrawn and hereby canceled without prejudice. For purposes of expedition, claims 12 and 18 have been canceled without prejudice or disclaimer. Claims 8, 13 and 14 have been amended in several particulars for purposes of clarity and brevity while Claims 21-26 have been newly added in accordance with current Office policy, to further and alternatively define Applicants' disclosed invention and to assist the Examiner to expedite compact prosecution of the instant application.

Claims 8-9, 11, 14-15, 17 and 20 have been rejected under 35 U.S.C. §102(e) as being anticipated by Gupta, U.S. Patent Application Publication Number 2002/0163072 for reasons stated on pages 2-3 of the Office Action (Paper No. 7). Specifically, in support of the rejection of claims 8-9, 11, 14-15, 17 and 20, the Examiner asserts that Gupta '072 discloses,

"a three three-dimensional (3-D) integrated chip system, comprising: a first wafer (Figs. 2-10 el. 202) including one or more integrated circuit (IC) devices (el. 112), metallic lines (el. 114, 115) deposited via an interlevel dielectric (ILD) (el. 113, 116) for wafer-to-wafer bonding and electrical interconnection, and an ILD recess surrounding the metallic lines deposited via the ILD (Fig. 7); and a second wafer (el. 100) including one or more integrated circuit (IC) devices (el. 112), metallic lines (el. 114, 115) deposited via an interlevel dielectric (ILD) (el. 113, 116) for wafer-to-wafer bonding and electrical interconnection, and an ILD recess surrounding the metallic lines deposited via the ILD (Fig. 7), wherein the metallic lines on the surface of the second wafer are bonded with the metallic lines on the surface of the first wafer to establish electrical connections between active IC devices on the adjacent wafers (Fig. 8; p.3 para. 29-30)."

As previously discussed, independent claims 8 and 14 have been amended to

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incorporate limitations of claims 12 and 18, i.e., that "the ILD is a high-temperature deformable dielectric used to allow the bonding areas to be self-leveling to account for height variations across the adjacent wafers to be bonded" in order to render the rejection moot.

This feature offers a number of benefits. Generally, after the dielectric recess, height variations in the metal layer across the wafer may cause some bond pads to be higher than other bond pads on the wafer. Without sufficient elastic or plastic deformation at either the metal bond pads or the dielectric during the bonding process, the adjacent wafers will bond only at the highest bond pads defining a plane. If the variability of the dielectric process is too great to allow more metal bond pads to make contact, the use of a more pliable, self-leveling dielectric material such as a high-temperature deformable dielectric will allow for better contact between the adjacent wafers during the bonding process because such a deformable dielectric will allow the bonding areas to be self-leveling to account for height variations across the adjacent wafers to be bonded as now defined in Applicants' independent claims 8 and 14.

In contrast to Applicants' claims 8 and 14, Gupta '072 discloses a method for bonding wafers together to form integrated circuits having a stack of thin layers as shown in FIGs. 1-11. However, there is no disclosure from Gupta '072 of Applicants' claimed "ILD" as "a high-temperature deformable dielectric used to allow the bonding areas to be self-leveling to account for height variations across the adjacent wafers to be bonded" as expressly defined in claims 8 and 14.

The rule under 35 U.S.C. §102 is well settled that anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. In re Paulsen, 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); In re

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Spada, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Those elements must either be inherent or disclosed expressly and must be arranged as in the claim. Richardson v. Suzuki Motor Co., 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989); Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); Verdegall Bros., Inc. v. Union Oil Co., 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987). The corollary of that rule is that absence from the reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 230 USPQ2d 81 (Fed. Cir. 1986).

The burden of establishing a basis for denying patentability of a claimed invention rests upon the Examiner. The limitations required by the claims cannot be ignored. See In re Wilson, 424 F.2d 1382, 165 USPQ 494 (CCPA 1970). All claim limitations, including those which are functional, must be considered. See In re Oelrich, 666 F.2d 578, 212 USPQ 323 (CCPA 1981). Hence, all words in a claim must be considered in deciding the patentability of that claim against the prior art. Each word in a claim must be given its proper meaning, as construed by a person skilled in the art. Where required to determine the scope of a recited term, the disclosure may be used. See In re Barr, 444 F.2d 588, 170 USPQ 330 (CCPA 1971).

In the present situation, Gupta '072 does not disclose and suggest all the features of Applicants' claims 8 and 14. Therefore, Applicants respectfully request that the rejection of claims 8 and 14 and their respective dependent claims 9, 11, 15, 17 and 20 be withdrawn.

Claims 10 and 16 have been rejected under 35 U.S.C. §103 as being unpatentable over Gupta '072 as applied to claims 8-9 and 14-15 above, and further in view of Desai, U.S. Patent No. 5,656,554. Since the correctness of this rejection

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is predicated upon the correctness of the rejection of Applicants' claims 8-9, 11, 14-15, 17 and 20, Applicants respectfully request that the rejection of claims 10 and 16 be withdrawn for the same reasons discussed against the rejection of Applicants' claims 8-9, 11, 14-15, 17 and 20.

Lastly, claims 12-13 and 18-19 have been rejected under 35 U.S.C. §103 as being unpatentable over Gupta '072 as applied to claims 8-9 and 14-15 above, and further in view of Barth, U.S. Publication No. 2003/0003703 and Forouhi, U.S. Publication No. 2003/0053081. In support of this rejection, the Examiner alleges that Barth '073 discloses that that "ILD" is "a high-temperature deformable dielectric used to allow the bonding areas to be self-leveling to account for height variations across the adjacent wafers to be bonded" and that such a high-temperature deformable dielectric is SILK which exhibits a glass transition near 450°C while the metallic lines exhibit a bonding temperature of about 400°C.

As previously discussed, claims 12 and 18 have been canceled without prejudice or disclaimer, and their subject matter has been incorporated into base claims 8 and 14. To the extent that the rejection may be applicable to the now amended claims 8 and 14, Applicants note that the Examiner has not cited any specific portion of Barth '703 to support his allegation, and that no where in Barth '703 is there any disclosure of Applicants' use of a high-temperature deformable dielectric used to allow the bonding areas to be self-leveling to account for height variations across the adjacent wafers to be bonded or that such a high-temperature deformable dielectric is SILK which exhibits a glass transition near 450°C while the metallic lines exhibit a bonding temperature of about 400°C as alleged by the Examiner.

The law under 35 U.S.C. §103 is well settled. In order to establish a *prima*

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facie case of obviousness under 35 U.S.C. §103, three basic criteria must be met. First, there must be some suggestion or motivation to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 2143. In other words, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USQP 494, 496 (CCPA 1970).

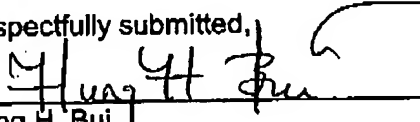
In the present situation, neither Gupta '072, Barth '703 nor Forouhi '308 discloses or suggests Applicants' claims 12-13 and 18-19. Therefore, Applicants respectfully request that the rejection of claims 12-13 and 18-19 be withdrawn.

Claims 21-26 have been newly added to alternatively define Applicants' disclosed invention over the prior art of record. These claims are believed to be allowable at least for the same reasons discussed against all the outstanding rejections of the instant application. No fee is incurred by the addition of claims 21-26 as claims 21-26 are added to replace the canceled claims 1-7.

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To the extent necessary, applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time, fees, to Deposit Account No. 01-2135 of Antonelli, Terry, Stout & Kraus, LLP (referencing Attorney Docket No. 219.40606X00), and please credit any overpayment of fees to such deposit account.

Respectfully submitted,


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